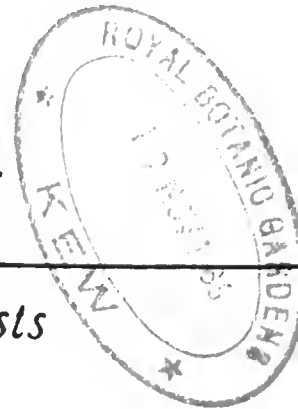


13-4/233

# THE BEAN BAG

*A newsletter to promote communication among research scientists  
concerned with the systematics of the Leguminosae/Fabaceae.*



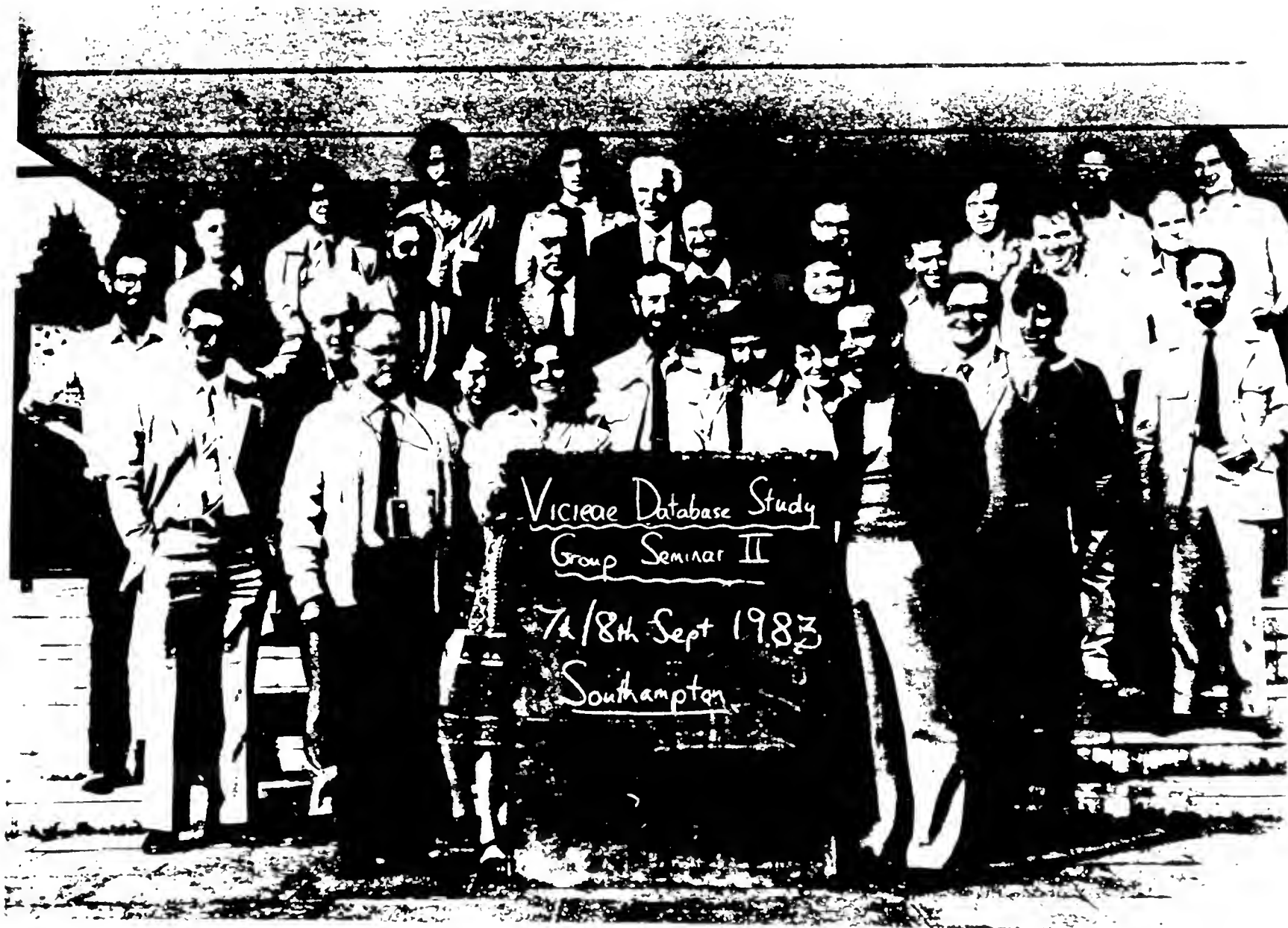
Ed.: C. R. Gunn, USDA, PE&T Lab. , Bldg. 265, BARC-East, Beltsville, MD 20705

Assoc. Ed.: J. A. Lackey, USDA, APHIS FB Rm. 633, Hyattsville, MD 20782

\*\*\*\*\*  
Number 19  
\*\*\*\*\* May 1984  
\*\*\*\*\*

From the Editor

This issue of the Bean Bag includes a new Directory of Readers. The noninstitutional readers who returned their yellow sheets are included in this Directory and will continue to receive the Bean Bag on a semiannual basis (May and November). Five readers who want to receive the Bean Bag have no addresses in our revised files. Please let Lydia Poole know the addresses for Paul Boon, Matt Lavin, K. K. Lakshmanan, Leelavathi,



\*\*\*\*\*

IV Latin American Botanical Congress  
by Enrique Forero

IV Latin American Botanical Congress: will be held in Medellin, Colombia on 29 June-5 July 1986. The First Circular will be distributed later this year. For information write Enrique Forero, Apartado 54546, Bogota, Colombia or Enrique Renteria, Jardin Botanico, Apartado 51407, Medellin, Colombia.

Note that the Second International Legume Conference will take place in St. Louis, Missouri on 16-20 June, 1986. This will give Legume specialists interested in attending the Latin American Congress enough time to travel to Colombia and maybe even to take part in one of the planned pre-congress field trips.

\*\*\*\*\*

Seeds of Psophocarpus  
by E. A. Bell

Seeds of Psophocarpus

The Royal Botanic Gardens, Kew are organising the collection of seeds of the African species of Psophocarpus, the wild relatives of the Winged Bean (*Psophocarpus tetragonolobus*). Members of the genus occur throughout Tropical Africa, mainly in savannas, at swamp edges, or the margins of forests. Descriptions of the species and distribution maps can be found in a recent review of the genus by B. Verdcourt and P. Halliday, Kew Bulletin 33: 191-227 (1979). Anyone proposing to visit Tropical Africa, or resident there, who would be prepared to make collections of seeds, is invited to contact:

Either The Director, Royal Botanic Gardens, Kew, Richmond,  
Surrey, TW9 3AB England

Or Dr. J. M. Lock, Pembroke House, 30 High Street, Milton,  
Cambridge, CB4 4DF England

for further information. Freight and other charges on consignments of seeds and voucher specimens will be refunded.

\*\*\*\*\*

SOYBEAN CONFERENCE  
World Soybean Research Conference III

12 - 17 August 1984  
Iowa State University, Ames, IA  
USA

For details write to Denis C. McGee, World Soybean Research Conference III,  
Iowa State University, Ames, Iowa 50011 USA.

\*\*\*\*\*

### International Organization of Plant Biosystematists

The International Organization of Plant Biosystematists (IOPB) was founded in 1960 to promote international cooperation in the study of biosystematics. The IOPB acts on several levels, from coordinating and publishing information of biosystematics to arranging conferences. The IOPB is open to all persons working or interested in the field of biosystematics. The history and past activities of IOPB is open to all persons working or interested in the field of biosystematics. The history and past activities of IOPB have been given in Taxon, 31: 386-387, 1982.

An IOPB Newsletter is sent to all members. Such items as current research, requests for materials, meeting reports, publications, etc. are reported. The Editor is Dr. Krystyna Urbanska, Geobotanische Institut, E.T.H., Zurichbergstrasse 38, CH-8044 Zurich, Switzerland.

Membership in IOPB is for the period between Congresses. The next International Botanical Congress will be in Berlin in 1987. The membership fee for 1983-1987 is \$25.00 (U.S.). Checks payable to the International Organization of Plant Biosystematists.

Send Payment to: Dr. Liv Borgen, Secretary-Treasurer, IOPB  
Botanical Garden and Museum,  
Trondeimsveien 23B,  
Oslo 5,  
Norway

\*\*\*\*\*

### PROPOSED FAO/IAEA COORDINATED RESEARCH PROGRAMME TO IMPROVE THE CAPABILITY OF THE GRAIN LEGUME-RHIZOBIUM SYMBIOSIS TO FIX ATMOSPHERIC NITROGEN by Dr. G. Hardarson

A Consultants Meeting on Breeding for Improved Nitrogen Fixation in Grain Legumes was held by the Joint FAO/IAEA Division of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development during the period 26 to 30 September 1983 at the Vienna International Centre, Austria.

The cost and restricted availability of nitrogen fertilizer pose a serious problem for agricultural production, in some of the developing countries. Biological nitrogen fixation, resulting from symbiosis between legume crops and rhizobial bacteria can reduce this problem by providing nitrogen for crop nutrition. Research has demonstrated that some genetic variability exists in both the plant (macrosymbiont) and the bacteria (microsymbiont). Furthermore, it has been possible to breed forage legumes for increased nitrogen fixation. A similar variability exists among grain legumes and it is hoped that it can also be found within species and can be exploited by plant breeding. Where the desired genotypes are not found among existing germplasm, mutation induction will be employed. Of particular importance would be the use of mutation induction to eliminate the regulatory system that blocks further nitrogen fixation, once nitrogen is available in the soil.

Guidelines for scientists regarding approach and methods to be used in breeding grain legumes with better capability to support symbiotic nitrogen fixation were formed during the above mentioned meeting. Increasing the yield as well as the nitrogen fixation capacity in grain legumes will require breeding for improvement of the host - Rhizobium symbiosis in addition to the improvement of agronomic characteristics and of resistance to pests and diseases. The complex relationships between these factors suggest that the problems will best be tackled by research teams, which should include a plant breeder, a microbiologist, and preferably a plant physiologist, in addition to experts in agronomy and plant protection. It was also recommended that N<sub>2</sub> fixation breeding programmes must be built up within established plant breeding programmes, where the expertise in dealing with inter-related breeding objectives exist. To verify the improved N-fixation capacity of new lines, <sup>15</sup>N techniques to quantify amounts of fixed nitrogen should be appropriately applied.

The possibility of initiating a coordinated research programme with the objective to increase grain legume yields by utilizing nitrogen derived from atmosphere rather than fertilizer nitrogen is now being considered at the Joint FAO/IAEA Division. Anyone interested in applying for participation in such a research programme is invited to write to Dr. G. Hardarson, FAO/IAWA Agricultural Biotechnology Laboratory, A-2444 Seibersdorf, Austria.

Please indicate your previous experience in this field and if you have been using <sup>15</sup>N in your research.

The number of participants in such research programmes is limited and the decision to approve participation in a coordinated research programme is made by the IAEA Director General.

\*\*\*\*\*

#### Lotus Newsletter

Lotus Newsletter, No. 14, 1983, is ready for distribution. It contains progress reports and other items on Lotus being carried throughout the world. A limited number of copies are available for distribution. Available from the Editor, Dr. W. F. Grant, Genetics Laboratory, Box 282, Macdonald Campus of McGill University, Ste. Anne de Bellevue, Quebec, Canada H9X 1C0. Cost \$5.00 postpaid. Please send payment if you wish a copy.

\*\*\*\*\*

#### Mansfeld's Catalog Announcement by Peter H. Hanelt

The manuscript of a second much enlarged version (edited by J. Schultze-Motel) of Mansfeld's catalogue of agriculturally and horticulturally cultivated plants of the world, firstly published in 1959, has been delivered to the press. It contains data regarding nomenclature, taxonomy, area of cultivation, uses, history and wild relatives for nearly 4700 species. The Leguminosae with more than 650 species proved to be the economically most important family (Caesalpinioideae, about 80; Mimosoideae, 100; Papilionoideae, 470 species, contributors having been J. Kruse, H. Ohle and

HANELT respectively). The majority of the species are cultivated for forage (185), food (110), green manure or as cover plants (90) or as shade trees for plantations (80). Less numerous are those ones cultivated for technical purposes, as medicinal and spice plants or for hedges and erosion control (between 50 and 60 species for every category). The Akademie-Verlag in Berlin will publish this work within 4 volumes in 1985.

\* \* \* \* \*

#### GLEANINGS

ACEBES-GINOVES, ARCO-AGUILAR, P. L. Perez and W. Wildpret have started a study of woody native legumes of the Canary Islands. Needs publications about *Chamaecytisus*. Offers seeds of Canary Island plants.

ALBUQUERQUE has started a study of seed germination.

ARCO-AGUILAR is monographing *Teline* in *Macaronesica*. Needs data on *T. monspessulanus* of the Azores and offers seeds of the Canary Islands. See also ACEBES-GINOVES.

ARAMBARRI continues seed morphology study of *Lotus* spp. Needs seeds of *L. parviflorus*, *L. macrotrichus*, *L. alpinus*, *L. borbasii*, *L. japonicus*, *L. schoelleri*. Offers seeds of *Acacia longifolia*, *A. dealbata*, *Albizia julibrissin*, *Spartium junceum* and some *Lotus* spp.

BAHADUR is studying handedness in *Psophocarpus tetragonolobus*. Needs seeds of other species and offers locally available legume seeds. Has several papers in press.

BARBOSA spent from 1 September through 18 November 1983, carrying out advanced training and research in the Botany Department, Missouri Botanical Garden. Area of concentration was the Colombian species of the legume genus *Pithecellobium* for a taxonomic revision of the sect. *Caulanthos* Benth (Zygia P. Browne) in Colombia under direction of Dr. Enrique Forero and Dr. A. Gentry. Will identify sheets of *Pithecellobium* of Central and South America.

BARNEBY is currently revising *Mimosa* of the Brazilian Planalto and would be pleased to receive material for identification.

BEHNKE is studying the development of wound phloem in *Pisum sativum* roots following a complete interruption of the vascular cylinder.

BIRCH received his Ph.D and with S. D. Wratten has in press "Taxonomic patterns a aphid resistance in the genus *Vicia*." Is completing with BISBY a taxonomic - agronomic paper on *Vicia* section *Faba*; is continuing his bruchid/legume interaction studies, especially the surface wax and testa chemistry as resistance factors of wild legumes (including SEM studies of *Vigna* spp. testa); is writing with Holt a paper "Impact of domestication on aphid resistance of *Vicia faba*." Wants cultivars or landrace seeds (neither dusted nor fumigated) of any legume crops with bruchid resistance. Offers seeds of *Vigna* spp. and cultivars of *V. unguiculata*.

BOON is testing cultivars of mungbean in the Moluccas in cooperation with A.V.R.D.C. of Taiwan and is studying uses *Leucaena leucocephala*. Needs seeds of *Acacia arabica* and offers seeds of *Leucaena leucocephala*.

BOUSSAID has two articles in press on morphogenesis in *Hedysarum carnosum*. Is also studying *H. membranaceum*, *H. peralderianum*, *Medicago ciliaris*, *M. littoralis*, *M. marina*, *M. tunetana*, *M. arborea*. Needs Mediterranean *Hedysarum* spp. and *H. carnosum*. Will be collecting in Sicily.

BRENAN expects to complete study of *Pseudoentada*.

BROCKWELL is studying the symbiotic relationships between native Australian *Glycine* spp. and *G. max* hybrids.

BURTON has retired but remains interested in nitrogen fixation.

CARRILLO is studying *Vicia* and needs seeds of *Phaseolus*, *Vigna*, *Macroptilium*, and *Vicia*.

CASTRO (new reader) is studying the structure and ultrastructure of the wood of 28 *Prosopis* spp. of Argentina.

CIALDELLA has in press in *Darwiniana* "The genus *Acacia* (Leguminosae) in Argentina." Is now revising the genus *Polygonum* (Polygonaceae) in Argentina.

CLEMONS has exhausted the supply of *Sesbania punctata* seeds.

CLEMENTS needs seeds of wild *Centrosema* spp. and will identify *Centrosema* spp.

COMBES is working with genetic resources of *Lathyrus sativus*. Needs seeds of *L. sylvestris*, *L. latifolius*, *L. tuberosus*, and *L. sativus*. Offers the same. [Ed. Note: Ask Dr. George A. White, Plant Introduction Officer, Rm. 322, Bldg. 001, BARC-West, Beltsville, MD 20705 USA]

DANIEL is working with *Rhizobium* and *Azotobacter* in the Fabaceae.

DELBOS needs *Lathyrus latifolius*, *L. heterophyllus*, and *L. tuberosus*. Offers seeds of *Lathyrus* species of France. [Ed. Note: Thank you for your comments.]

DILCHER continues research on fossil history of legumes. Has collection of flowers, fruits (pods), and vegetation (leaflets) of Eocene age material.

DOUJA (new reader) is studying *Medicago* and welcomes research material. Will be collecting in Tunisia during May-June, 1984. [Ed. Note: Send your *Medicago* want list to Herb Spencer, Plant Introduction Station, Iowa State University, Ames, Iowa 50011 USA]

ELIAS (new address) has started two studies: Distribution of extrafloral nectaries in mimosoid legumes and pollination biology in selected species of *Calliandra*.

EVANS, Dale continues with research on *Sesbania* and needs 30-150 seeds of *S. grandiflora*. Can furnish seeds of other *Sesbania* spp.

EVANS, S. V. has been awarded a Ph.D. and with STIRTON and KINGHORN are continuing "A Chemotaxonomic Study of the Sophoreae", also now interested in Dalbergieae and Swartzieae.

FELKER is conducting a field trial evaluation of 65 *Leucaena* collections including 50 *L. pulverulenta* half-sib families. Mimosine, frost tolerance, and biomass production are being evaluated.

FERGUSON writes to say pollen morphological/taxonomy of tribes Amorpheae, Psoraleeae and Swartzieae are in various stages of preparation. FERGUSON, GUINET and SENESSE (Montpellier) are collaborating on a study of the exine stratification of Caesalpinioideae pollen. Needs viable seeds of *Macrotyloma maranguense*.

FANTZ needs seeds of tropical *Clitoria* spp. and offers seeds of American *Clitoria*. Willing to annotate all specimens of *Clitoria* and *Neurocarpum*.

FORDE is assembling genetic resource collections of *Chamaecytisus palmensis* and *Trifolium* spp. and welcomes seeds. Offers temperate agricultural legumes.

FORERO with others is studying neotropical species of *Calliandra*. Needs vouchered seed samples (about 1 pound per sample) for chemical analysis, leaves for chemical analysis, and viable seed for germination. Will annotate specimens.

GILL with Obi and Husaini published a paper on the mycoflora of selected Nigerian legume seeds in volume 6 of *Legume Research*. Has started palynological studies of the legume of southern Nigeria and histochemistry of the bark of selected legume hardwood species.

GOMEZ-SOSA continues with her study of *Astragalus* of South America, especially Argentina. Needs herbarium specimens from Chile, Bolivia, Peru and Ecuador. Offers specimens from Argentina.

GONZALEZ is studying the preservation and propagation of the beautiful *Brownea macrophylla* and its allies.

GRANT and C. C. Marten have the chapter on birdsfoot trefoil in the soon to be published book "Forages: The Science of Grassland Agriculture," 4th ed. and GRANT has a book "Plant Biosystematics" in press with Academic Press, Toronto.

GRETHER needs herbarium specimens of *Mimosa* and offers Mexican species of *Mimosa*.

GUNN is finishing his study of the fruits and seeds of the Caesalpinioideae to be published in 1986 as a USDA Technical Bulletin. Has started with Carolyn Mitchell a study of seed morphology of the Swartzieae.

HAHN (new address) wants material of the Mimosoideae from southern South America. Will try to fill requests from Paraguay.

HAQ is working with interspecific hybridization of *Vigna*. Needs seeds of *Otoptera burchellii*.

HEGNAUER will treat legumes in volume 9 of "Chemotaxonomie der Pflanzen" to be published in 1986 or 1987; volumes 7 and 8 (addenda to volumes 1-6) are in preparation. Needs reprints of phytochemical-legume publications.

HERINGER is working with the ornamental and honey food aspects of *Dalbergia hortensis* and *Platymiscium floribundum*.

HERNANDEZ M. needs seeds of any species of *Calliandra* and will annotate *Calliandra* spp. of Mexico and Central America.

HEYN has started two projects: a comparative study of legume testa (in cooperation with M. Kislev and PLITMANN) and pollination systems in legume (in cooperation with R. Dulberger, G. Alon, and E. Werker). See also PLITMANN. Needs seeds of viable *Lupinus* spp. from Africa and offers seeds of local species of *Medicago* and *Lotus*.

HUGHES offers seeds of central American tree legumes for comparative field trials.

HUIGNARD is studying bruchids attacking pulses: *Vigna unguiculata*, *V. triloba*, *V. ambacensis* in Africa; *Phaseolus* spp. in South America; and selected *Caesalpinia* spp. in Africa. Needs seeds of *Phaseolus vulgaris*, *P. coccineus*, and wild varieties of *P. lunatus*. [Ed. Note: Contact Dr. George A. White, Plant Introduction Officer, Room 322, Bldg. 001, BARC-West, Beltsville, MD 20705 USA]

ISELY has been working with the Leguminosae in several southeastern USA herbaria for the Vascular Flora of the Southeastern United States.

ISOM is establishing field plot techniques for testing *Phaseolus vulgaris*, *P. lunatus*, and *Vigna unguiculata*.

JACKSON needs *Erythrina* seeds and offers seeds of 50 *Erythrina* spp.

JANSEN is dating *Hymenaea courbaril* tree rings and studying wind pollination of *Ateleia herbert-smithii* in Costa Rica.

KARATELA needs literature on stomatogenensis in legumes.

KINGSOLVER has started two studies: 1) The bruchid genus *Algarobius*, a seed-predator of *Prosopis* in Southwestern U.S., Mexico, Central America and northern South America, and 2) the bruchid genus *Merobruchus* that feeds primarily in seeds of *Acacia* and *Lysiloma*, but also in *Pithecellobium* and *Albizia*.

KOEPPEN is trying to reactivate studies of *Apuleia* and *Dialium*.

KRETSCHMER needs seeds of *Lotononis* spp. and offers various herbaceous legume seeds.

LABEYRIE is studying the use of legume pollen by adult bruchids, whose larvae attack seeds, especially the relationship of bruchids and pollination of *Lathyrus*. Also studying the relative importance of vegetative multiplication and sexual reproduction in the structural evolution of communities of *Lathyrus latifolius* and *L. sylvestris*. Needs seeds of *L. sativus* and *L. tuberosus* and offers seeds of *L. sylvestris* and *L. latifolius*. [Ed. Note: See Ed Note for Combes.]

LANGENHEIM needs seeds of African species of *Copaifera* and *Guibourtia* and offers collections of New World *Hymenaea* and *Copaifera*.

LAVIN is studying *Coursetia* and allied genera. Needs seeds or roots of *Cracca* and *Coursetia*. [Ed. Note: Not included in the May 1984 Directory. Need address.]

LEWIS is considering studying neotropical *Caesalpinia* for his dissertation. Contact him if this clashes with ongoing research.

LIMA with G. M. Barroso is studying the legumes of the State of Rio de Janeiro. LIMA also is revising tribe *Goniorrhachis*. Needs material (including seeds) of the *Dipteryx*eae and offers legume material from Rio de Janeiro.

LONG is examining the native soil species of *Rhizobium meliloti* which interact with local isolates of *Medicago lupulina*, *M. polymorpha*, and *Melilotus indica*. He is following the pattern of microbe-plant interaction at several sites at the Jasper Ridge Biological Preserve. Needs *Medicago* or *Melilotus* with defects in their ability to nodulate with any particular strain or strains of *Rhizobium*. Offers strain collection of different *Rhizobium meliloti*.

Makasheva, R. K. 1983. (English translation). The Pea. Kolos Publishers, Leningrad (1973 in Russian). [267 pp., illustrated. Available from U.S. Dept. Commerce, National Technical Information Service, Springfield, VA 22161, USA. Price unknown, supply limited. For plant breeders and agronomists, with 57 pages devoted to morphology and classification.]

MARRAKECHI is surveying the genetic resources in *Lathyrus sativus*. Will be collecting in Sicily. Needs seeds of *Hedysarum* spp. and *Lathyrus sativus*. Offers seeds of the Mediterranean species of *Hedysarum* and other legumes.

MBENKUM is studying *Millettia* spp. of lower Guinea (South Nigeria, Cameroon, and Gabon). Will collect in area from April to July.

MESQUITA (new reader) is finishing his study of *Enterolobium*.

MIEGE has started studies of seeds and seed proteins of *Phaseolus acutifolius*, lectin biosynthesis in *Phaseolus*, and *Cordeauxia edulis*. Need seeds of *Cordeauxia edulis*.

MILLER. See QUIRK.

MONTEIRO has finished the research on the New World *Sesbania* and Brazilian unifoliolate *Lupinus* and is preparing his Ph.D. dissertation, which will be submitted to St. Andrews University (Scotland) by June 1984. Need seeds of North American unifoliolate *Lupinus* spp.

MOUSSAVI is studying *Melilotus* spp. in Iran.

NEILL continues with biosystematic study of *Erythrina* for doctoral dissertation. Currently studying the fertile  $F_1$  hybrids at Pacific Tropical Botanical Garden in Hawaii, which he produced in 1982. Expects to complete dissertation in October 1984. Needs viable seeds of African and Asian *Erythrina* spp. and offers same from Mexico and Central America.

NERO has started a project on nitrogen fixing trees of Bhutan, Sikkim, and Nepal. Researchers may write for seeds (quantity limited) during the Fall of 1984.

OLDEMAN has started a study of silvicultural diagrams of tropical legume trees.

OLIVEIRA is studying *Aeschynomene* of Rio Grande do Sul.

OSMAN is studying *Leucaena leucocephala* and needs seeds of dwarf selections as well as other fast-growing woody legumes. Offers seeds of giant and common selections of *Leucaena leucocephala* as well as cv. K156 of *L. diversifolia* and *Calliandra calothyrsus*. [Ed. Note: Write to Dr. Jack Oakes, Room 340, Bldg. 001, BARC-West, Beltsville, MD 20705 USA]

PALMER was a visiting scientist for four months at the Soybean Institute, Jilin Academy of Agricultural Sciences, Peoples Republic of China.

PLITMANN with M. Kislev and HEYN is studying biological changes induced by domestication. Needs seeds of African *Lupinus* spp. and offers seeds of local *Lupinus* spp. See HEYN.

PODLECH is revising *Astragalus* sections *Poterion*, *Microphysa*, and *Myobroma*. Also with E. Kozik has paper in press on revision of section *Thiochrus*.

PONERT is studying haploidization of diploid legume cell suspension cultures. Needs cell suspension cultures.

PRAKASH is conducting embryological studies on Australian legumes. Needs any legume material from the New England tablelands of New South Wales, Australia.

PRANCE offers legume material from the Amazonian basin.

Quirk, J. T. and MILLER have a paper in press: Nonvestured pits in *Koompassia* in IAWA Bulletin. Started several projects: Vestured pits in the tribe *Cassieae*, data for a computer-assisted wood identification system II, Africa and III, New World. Need vouchered wood samples or sectioning blocks of *Labichea*, *Petalostylis*, and *Zenia*. Offer in return permanent microslides and will exchange vouchered wood samples.

RAINA is studying *Vigna aconitifolia*. Needs seeds of *Vigna* spp. and offers seeds of *Crotalaria* spp. [Ed. Note: Contact Dr. George White, Plant Introduction Officer, Rm. 322, Bldg. 001, BARC-West, Beltsville, MD 20705 USA.

RAO, M. M. (new address) is studying pollen morphology of selected interspecific hybrids of *Phaseolus* and *Cajanus*. Needs publications on pollen morphology of the *Fabaceae*, especially tribe *Phaseoleae*.

RAO, Sudatha (new address) has been awarded a Ph.D. and published several papers on the reproduction biology of *Atylosia*, the subject of her dissertation.

RICO-ARCE is studying *Acacia* and *Pithecellobium* for "Flora Mesoamericana," *Acacia*, *Albizia* and *Pithecellobium* for "Flora de Nicaragua," and *Acacia* for Mexico and Central America. Needs above specimens and will identify.

RODRIGUEZ PEREZ needs *Prosopis tamarugo*, *P. alba*, and *P. chilensis*. Offers *Cassia sturtii* and *Phaseolus acutifolius* var. *latifolius*.

ROSENTHAL needs *Dioclea* spp.

ROSS is revising *Hovea*.

RUMBAUGH is studying interspecific hybridization of *Hedysarum* spp. Needs seeds of *Hedysarum* spp. and offers seeds of *H. boreale*.

SAINT-MARTIN is studying the stomata of *Sophoreae* and the testa of legume seeds. Needs seeds of *Ononis* spp.

SANTOS has named a new species of *Cicer*. Offers legume seeds collected from the Canary Islands.

SCHRIEBE is revising the Southern African species of the *Tephrosieae*, especially *Tephrosia*.

SCHRODER needs seeds of *Leucaena* spp.

SCHULTZE-KRAFT is collecting native legume seeds in Colombia, Brazil, Venezuela, Central America, Thailand, Indonesia, and southern China. Needs seeds of tropical legumes suitable for forage. Offers CIAT germplasm catalog.

SHAWE (new reader) just started on *Moldenhauera* (Ph.D. dissertation) and needs to know as soon as possible if anyone else is working with this genus. Needs herbarium specimens with fruits, seeds and flowers (in spirits), viable seeds, color photographs of inflorescences, details of known localities. Will annotate *Moldenhauera* and *Melanoxylon*.

SMALL needs seeds of *Medicago*, *Melilotus*, and *Trigonella*.

SOUSA needs tropical legumes and offers Mexican legumes.

SPRENT has proposed a cooperative project with J. Dobereiner (in Brazil) on nodulation and nodule development in the *Caesalpinioideae*. They are currently investigating nodulation in aquatic *Mimosoideae*, mainly *Neptunia oleracea*.

STIRTON needs seeds of the tribe *Sophoreae* for chemical analysis.

STRITCH, a doctoral student of MOHLENBROCK, is revising *Wisteria*.

THOTHATHRI has started a survey of the legumes of Arunachal Pradesh, India.

VAN DER MAESEN (new address) needs *Cajaninae* and *Cicer* spp. and offers *Cajaninae* and *Cicer*.

VASSAL has a treatment of the Mediterranean species of *Acacia* in press in *Comptes-Rendus* and has three papers in preparation: 1) Ultrastructure of testa of *Acacia* Sections *Aculeiferum* and *Acacia*, 2) systematics of Section *Heterophyllum*, and 3) with M. Mouret "Modalites histologique de la gommose des *acacia*."

VERDCOURT, who is now working with the Rubiaceae, has a few copies of the "New Guinea Legume Manual" for 5 (sterling) excluding postage. [Ed. Note: One of the few book bargains still available.]

VIJAY KUMAR (new address) needs herbarium specimens of species in tribe Galegeae. Offers specimens of Indigofera spp. from South India. Obtained Ph.D., studying selected Indigofera spp. and has published on subject.

VIRASORO (new address) is organizing a herbarium and revising Herbario xiloteca and Carpoteca. Is preparing a Index Semina.

WONG, Westly, Librarian, Economic Botany Library of Oakes Ames, Harvard Botanical Museum needs abstracts of Field Beans (CIAT) Vol II (1978) and Vol. VI (1981). Offers assorted back numbers (1975-1981) of Tropical Grain Legume Bulletin (Ibadan, Nigeria).

YAKOVLEV is conducting chemotaxonomical study of Caragana and Cytisus.

YU offers Acta Phytotaxonomica Sinica and Delectus Seminum.

ZARUCCHI is now at the Missouri Botanical Garden.

ZINDLER-FRANK offers seeds of Rhynchosia caribaea and R. phaseoloides.

\* \* \* \* \*

#### RECENT LITERATURE

M. Aouni, M. Besi, MARRAKCHI, J. Figier. 1982. Les comportements meiotiques d'un tetraploide naturel et d'un tetraploide artificiel dans le genre Hedysarum en Tunisie. Rev. Fac. Sci., Tunis 2:207-210.

Arrhenius, S. P., C. E. Foster, C. G. Edmonds and LANGENHEIM. 1983. Sesquiterpenes in leaf pocket resins of Copaifera species. Phytochemistry 22:471-472.

Augsburger, C. K. and K. P. Hogan. 1983. Wind dispersal of fruits with variable seed number in a tropical tree (Lonchocarpus pentaphyllus: Leguminosae). American Journal Botany 70(7):1031-1037.

BALANDRIN, E. F. Robbins, and KINGHORN. 1982. Alkaloid distribution in some species of the papilionaceous tribes Thermopsidae and Genisteae. Biochem. Syst. Ecol. 11:307-311.

BARNEBY. 1983. A new variety of Dalea eriophylla (Leguminosae: Amorphaeae) from Sierra Madre Oriental Mexico. Sida 10:14.

Bernal, H. Y. 1983. Una nueva especie de Crotalaria (Fabaceae-Faboideae) de Colombia. Mutisia 54:1-4.

Bhacca, N. S., BALANDRIN, KINGHORN, T. A. Frankiel, R. Freeman, and G. A. Morris. 1983. A carbon-13 and proton two-dimensional NMR study of the Ormosia alkaloids panamine, ormosanine and ormosinine. Jour. Am. Chem. Soc. 105:2538-2544.

- Busman, M. T. M. and A. J. P. de Haas. 1982. A revision of the genus *Tephrosia* (Leguminosae, Papilionoideae). *Blumea* 28:421-487.
- Cardone, M. A., L. Llorens, and E. Sierra. 1983. Etude biosystematique de *Dorycnium pentaphyllum* Scop. subsp. *fulgurans* (Porta) comb. nova, endemique des Baleares orientales. *Collectanea Botanica* 14:133-150.
- Chriki, A., COMBES and MARRAKECHI. 1982. The study of two acyanic mutants in *Hedysarum coronarium* L. *C. R. Acad. Sc. Paris*, 294:739-742.
- Classen, D., NOZZOLILLO, and SMALL. 1983. A phenolic taxometric study of *Medicago* (Leguminosae). *Can. Jour. Bot.* 60:2477-2495.
- CORBY, POLHILL, and SPRENT. 1983. Taxonomy. In W. J. Broughton (ed.), *Nitrogen Fixation* 3:1-35.
- Delannay, X. and PALMER. 1982. Four genes controlling root fluorescence in Soybean *Crop Sci.* 33:278-281.
- DELGADO-SALINAS, E. Martinez-Hernandez, and P. Fernandez. 1982. Estudio del polen de *Phaseolus chiapasanus* Piper (Leguminosae: Phaseolinae). *Bol. Soc. Mex.* 43:25-34.
- FANTZ. 1982. New species of *Clitoria* subgenus *Bractearia* section *Flexuosae* (Fabaceae) from Peru and Colombia. *Sida* 9(4):293-301.
- FANTZ. 1982. New species of *Clitoria* subgenus *Bractearia* section *Cauliflorae* (Fabaceae) from northern South America. *Sida* 9(4):344-354.
- Farooqui, S. M., Bhaskar, K. V., and BAHADUR. 1982. Seed morphology (LM & SEM) in three species of *Abrus* (Fabaceae). *Indian Bot. Reporter* 1:61-62B.
- FORERO, O. de Benavides & E. Ortega. 1983. Tipos de Leguminosae: Faboideae en el Herbario Nacional Colombiano. *Mutisia* 58:1-4.
- FORERO, H. Y. Bernal & L. M. Quinones. 1983. Tipos de Leguminosae: Caesalpinioideae en el Herbario Nacional Colombiano. *Mutisia* 59:1-4.
- FORERO & R. Ruiz. 1983. Tipos de Leguminosae: Mimosoideae en el Herbario Nacional Colombiano. *Mutisia* 57:1-6.
- GOMEZ-SOUSA. 1982. Novedades an al genero *Astragalus*. II (Leguminosae: Galegeae). *Darwiniana* 24:23-31.
- GOMEZ-SOUSA. 1983. Nueva Especie de *Astragalus* (Leguminosae: Galegeae) de Patagonia. *Hickenia* 11(2):5-7.
- Gupta, P. K. and K. Ararwal. 1982. Cytological studies in the genus *Indigofera* (Fabaceae). *Cytologia* 47:665-681.
- HESLOP-HARRISON and HESLOP-HARRISON. 1983. Stigma organisation and the control of fertilisation in *Phaseolus*. From *Eucarpia Meeting on Phaseolus Bean Breeding*, Hamburg, 1983. Ed., R. Reimann-Philipp. pp. 88-96.
- HIJWEGEN. 1982. The rust genus *Uropyris* and the position of *Diphysa* (Leguminosae). *Act. Bot. Neerl.* 31:135-136.

HOC. 1982. The genus *Pithecellobium* (Mimosoideae: Ingeae) in Argentina. 2. Study of pollen. *Darwiniana* 24:33-48.

HOPKINS, M. J. G. 1983. Unusual diversities of seed beetles (Coleoptera Bruchidae) on *Parkia* (Leguminosae, Mimosoideae) in Brazil. *Biol. Jour. Linn. Soc.* 19:329-338.

Horner, H. T. and ZINDLER-FRANK. 1982. Histochemical, spectroscopic, and x-ray diffraction identification of the two hydration forms of calcium oxalate crystals in three legumes and *Begonia*. *Can. J. Bot.* 60, 1021-1027.

Horner, H. T. and ZINDLER-FRANK. 1982. Calcium oxalate crystals and crystal cells in the leaves of *Rhynchosia caribaea* (Leguminosae: Papilionoideae). *Protoplasma* 111:10-18.

Horovitz, A. and HARDING. 1983. Genetics of *Lupinus* XII. The mating system of *Lupinus pilosus*. *Bot. Gaz.* 144(2):276-279.

Hossaert-Palauqui, M. and DELBOS. 1983. *Lathyrus tuberosus* L. biologie et perspectives d'amélioration. *Jour. d'Agri. et Bota. Appl.* 30:49-58.

Hyang, Y. 1983. A taxonomic study of the genus *Albizia* from China. *Acta Bot. Yunnanica* 5:127-139. [27 species, 8 new combinations.]

ISELY. 1983. The *Desmodium paniculatum* (L.) DC complex revisited. *Sida* 10:142-158.

ISELY. 1983. New combinations and two new varieties in *Astragalus*, *Orophaca* and *Oxytropis* (Leguminosae). *System. Bot.* 8:420-426.

JACKSON and A. S. Chawla. 1982. Studies of *Erythrina* alkaloids, Part IV. G.C./M.S. Investigations of alkaloids in the leaves of *E. poeppigiana*, *E. macrophylla*, *E. berteroana* and *E. salviiflora*. *Erythrina Symposium IV.*, *Allertonia* 3(1):39-45.

JACKSON and A. S. Chawla. 1982. *Erythrina* and related alkaloids, Vol. 12 (Ed., M. F. Grundon) *R. S. C. Specialist Periodical Reports*, 155-162.

JACKSON, A. S. Chawla, and M. I. Abdulla. 1982. Partial synthesis of 11-oxygenated *Erythrina* alkaloids. *J. C. S. Chem. Comm.* 904-905.

JACKSON, A. S. Chawla, and S. Chunchatprasert. 1983. Studies of *Erythrina* alkaloids VII - <sup>13</sup>C NMR spectral studies of some *Erythrina* alkaloids. *Org. Mag. Reson.* Vol. 21(1):39-41.

JACKSON, A. S. Chawla, and Ludgate, P. 1982. *Erythrina* alkaloids, Part VI. Isolation and Characterisation of alkaloids from *Erythrina berteroana* seeds and leaves: Formation of oxoerythroidines. *Jour. Chem. Soc. Perkin Trans. 1*, 2903-2907.

JACKSON, P. Ludgate, Mavraganis, and F. Redha. 1982. Studies of *Erythrina* alkaloids, Part V. G.C./M.S. Investigations of alkaloids in the seeds of *E. subumbrans*, *E. lanata*, *E. rubrinervia*, *E. acanthocarpa*, *E. variegata*, and *E. melanacantha*. *Erythrina Symposium IV*, *Allertonia* 3(1):47-51.

JANZEN. 1982. Simulation of *Andira* fruit pulp removal by bats reduces seed predation by *Cleogonus* weevils. *Brenesia* 19/20:165-170.

- JANZEN. 1982. Horse response to *Enterolobium cyclocarpum* (Leguminosae) fruit crop size in a Costa Rican deciduous forest pasture. *Brenesia* 19/20:209-219.
- JANZEN. 1982. Weight of seeds in 1-3 seeded fruits of *Lonchocarpus costaricensis* (Leguminosae), a Costa Rican wind-dispersed tree. *Brenesia* 19/20:363-368.
- JANZEN. 1982. Seed removal from fallen guanacaste fruits (*Enterolobium cyclocarpum*) by spiny pocket mice (*Liomys salvini*). *Brenesia* 19/20:425-429.
- JANZEN. 1982. Cleogonus weevil seed predation on *Andira* can be predicted by fruit punctures. *Brenesia* 19/20:591-593.
- JANZEN. 1982. Cenizero tree (Leguminosae: *Pithecellobium saman*) delayed fruit development in Costa Rican deciduous forests. *Amer. Jour. Bot.* 69:1269-1276.
- JANZEN. 1982. Variation in average seed size and fruit seediness in a fruit crop of a guanacaste tree (Leguminosae: *Enterolobium cyclocarpum*). *American Jour. of Bot.* 69:1169-1178.
- JANZEN. 1982. Removal of seeds from horse dung by tropical rodents: Influence of habitat and amount of dung. *Ecology* 63:1887-1900. [Seeds are *Enterolobium cyclocarpum*.]
- JANZEN. 1982. Differential seed survival and passage rates in cows and horses, surrogate Pleistocene dispersal agents. *Oikos* 38:150-156.
- JANZEN. 1983. Dispersal of seeds by vertebrate guts. In *Coevolution*, D. J. Futuyma and M. Slatkin, eds., Sinauer Associates, Sunderland, Massachusetts, pp. 232-262. [Dwells at length on a hypothetical legume tree and evolution of its interaction with dispersal agents.]
- JANZEN. 1983. Larval biology of *Ectomyelois muriscis* (Pyralidae: Phycitinae), a Costa Rican fruit parasite of *Hymenaea courbaril* (Leguminosae: Caesalpinioideae). *Brenesia* 21:387-393.
- JANZEN, D. G. Lynn, FELLOWS, and W. Hallwachs. 1982. The indole alkaloid hypaphorine and *Pterocarpus* seed protection. *Phytochemistry* 21:1035-1037.
- JOHNSON and JANZEN. 1982. Why are seeds of the Central American guanacaste tree, *Enterolobium cyclocarpum*, not attacked by bruchids except in Panama? *Environmental Entomology* 11:373-377.
- KINGHORN, BALANDRIN, and L.-J Lin. 1982. Alkaloid distribution in some species of the papilionaceous tribes Sophoreae, Dalbergieae, Loteae, Brongniartieae and Bossiaeeae. *Phytochemistry* 21:2269-2275.
- KINGSOLVER. 1982. Taxonomic studies in the genus *Rhipibruchus* Bridwell (Coleoptera: Bruchidae), with descriptions of four new species. *Proc. Entomol. Soc. Washington* 84:661-684.

- KINGSOLVER. 1983. A review of the genus *Scutobrachus* Kingsolver (Coleoptera: Bruchidae) with descriptions of four new species, and new synonymy. *Proc. Entomol. Soc. Wash.* 84:513-557.
- Klozova, E., Turkova, V., SMARTT, Pitterova, K. and Svachulova, J. 1983. Immunochemical characterization of seed protein of some species of the genus *Arachis*. *Biol. Plant (Prague)* 25:201-208.
- LARSEN and LARSEN. 1983.. The genus *Bauhinia* in Australia: Taxonomy and Palynology. *Bot. Helv.* 93:313-220.
- LANGENHEIM, D. E. Lincoln, W. H. Stubblebine, and A. L. Gabrielli. 1982. Evolutionary implications of leaf resin pocket patterns in the tropical tree legume *Hymenaea* (Caesalpiniodeae: Leguminosae). *Amer. Jour. Bot.* 69:595-607.
- LANGENHEIM and W. H. Stubblebine. 1983. Variation in leaf resin composition between parent tree and progeny in *Hymenaea*: Implications for herbivory in the humid tropics. *Biochem. Syst. Ecol.* 11:97-106.
- Lawrie, A. C. 1983. Relationship among rhizobia from native Australian legumes. *Appl. Environ. Microbiol.* 45:1822-1828.
- LERSTEN. 1983. Suspensors in Leguminosae. *Bot. Rev.* 49:233-257.
- LIMA. 1983. Novos taxa de Leguminosae-Papilionoideae do Brasil. *Bradea* 3(45):399-405. [New genus: *Grazilodendron*.]
- MASLIN. 1983. Studies in the genus *Acacia* (Leguminosae: Mimosoideae) - 13 and 14. *Nuytsia* 4(3): 367-381 and 383-410.
- MISRA and R. Sinha. 1981. Cassia in Islamic Medicine and its Modern Uses. *Islamic Medicine (Kuwait)* 1:390-394.
- MONCUR. 1981. Floral Initiation in Field Crops. An Atlas of Scanning Electron Micrographs. CSIRO, Melbourne.
- MAHESHWARI. 1982. Review: Advances in Legume Systematics. Part 1 and 2. *Jour. Econ. Tax. Bot.* 3:325.
- Narsaiah, G. and BAHADUR. 1982. Studies on the epidermal features in six species of *Macroptilium* (Benth.) Urb. (Fabaceae.) *Indian Bot. Repr.* 1:96-11.
- Nelson, D. M. and JOHNSON. 1983. Selenium in seeds of *Astragalus* (Leguminosae) and its effects on host preference of bruchid beetles. *Jour. Kansas Entomol. Soc.* 56:267-272.
- NIELSEN. 1982. The Australian species of *Archidendron*. *Nord Jour. Bot.* 2:479-490. [9 species in Australia.]
- NIELSEN. 1983. Legumineuses: Mimosees. In *Flore de la Noruvelle Caledonie et de pendances* 12:3-103.
- NIELSEN, GUINET, and BARRETTA-KUIPERS. 1983. Studies in the Malesian, Australian, and Pacific Ingeae (Leguminosae: Mimosoideae). *Bull. Mus. Nat. Hist. Nat., Paris* 4e ser., 5 sect. B. *Adansonia* number 3:303-329 and *ibid.* number 4:335-360.

- Niezgoda, C. J., Feuer, S. M., and NEVLING. 1983. Pollen ultrastructure of the tribe Ingeae (Mimosoideae: Leguminosae). *Amer. Jour. Bot.* 70:650-667. [All genera, except *Wallaceodendron*, in the Ingeae were studied.]
- OLIVEIRA. 1983. Estudo taxonomico do genero *Desmodium* Desv. (Leguminosae-Faboideae) no Rio Grande do Sul. *Iheringia. Ser. Bot.* (31):37-104.
- PACLT. 1984. A note on *Triaenodendron*, with new combinations in *Gleditsia*/Caesalpinaceae/. *Taxon* 33:100-101.
- Pilbeam, D. J., Lyom-Joyce, A. J. and BELL. 1983. Occurrence of the pymolizidine alkaloid monocrotaline in *Crotalaria* seeds. *Jour. Nat. Prods.* 46(5):601-607.
- Pillai, A. and Sharma, K. C. 1983. Seedling anatomy of some Mimosoideae (*Albizia lebbek*, *Pithecolobium dulce*). *Feddes Repertorium* 94(3/4):225-231.
- PODLECH. 1982. Neue Aspekte zur Evolution und Gliederung der Gattung *Astragalus* L. *Mitt. Bot. Staatss. Munchen* 18:359-377.
- PODLECH. 1983. Zur taxonomie und nomenklatur der tragacanthoiden Astragali. *Mitt. Bot. Staatss. Munchen* 19:1-23.
- Pramanik and THOTHATHRI. 1983. Taxonomic Notes on the genus *Alysicarpus* Desv. *Bull. Bot. Surv. India* 24:112-113.
- PRENDOTA. 1983. Recherches sur l'Utilisation de *Phaseolus acutifolius* A. Gray pour l'amelioration du haricot commun (*P. vulgaris* L.). Ph.D. disseration, Faculte des Sciences Agronomiques de l'etat Gembloux, Belgium.
- Quirk, J. T. 1983. Data for a computer-assisted wood identification system. I. Commercial legumes of tropical Asia and Australia. *IAWA Bull. n.s.* 4:118-130.
- RAINA and Rees, H. 1983. DNA variation between and within chromosome complements of *Vicia* species. *Heredity* 51:335-346.
- RAINA and Rees, H. 1982. Variation in chromosomal DNA associated with evolution of *Vicia* species: In, *Proc. Kew Chromosome Conference II*. George Allen and Unwin (London), pp. 360.
- RICO-ARCE. 1982. *Acacia velvae* y *A. mirandae* (Leguminosae), dos nuevas especies para Mexico. *Bol. Soc. Bot. Mex.* 43:67-71.
- ROSENTHAL and JANZEN. 1983. Avoidance of nonprotein amino acid incorporation into protein by the seed predator *Caryedes brasiliensis* (Bruchidae). *Jour. Chem. Ecol.* 9:1353-1361. [Further exploration of how a specialist bruchid eats *Dioclea megacarpa* seeds.]
- ROSS. 1983. A revision of the genus *Platylobium* Sm. (Papilionaceae). *Muelleria* 5:127-141.
- Rossow, R. A. 1982. Notes on the genus *Lathyrus* (Leguminosae). *Darwiniana* 24:489-496. [12 taxa from Patagonia.]

- RUDD and CARTER. 1983. *Acacia pacensis* (Leguminosae: Mimosoideae), a new species from Baja California Sur, Mexico. *Madrono* 30:176-180.
- SAINT-MARTIN. 1984. Ontogenie des Plantules et Phytodermologie chez les Papilionaceae. *Gaussenia* 1:26 spp.
- SANTOS. 1983. Vegetacion y flora de la isla de La Palma. Ed. Interinsular Canaria. Santa Cruz de Tenerife (Islas Canarias)
- SHAH and S. Ranga. 1982. Pericarpial trichomes in Mimosaceae structure and ontogeny. *Acta Bot. Indica* 11(1):19-23.
- SMALL and B. S. Brookes. 1983. The systematic value of stigma morphology in the legume tribe Trifolieae with particular reference to *Medicago*. *Can. Jour. Bot.* 2388-2404.
- SMALL, L. P. Lefkovitch, and D. Classen. 1982. Character set incongruence in *Medicago*. *Can. Jour. Bot.* 60:2505-2510.
- STAINER and F. Horvat. 1983. Study of the exine in the *Phaseolus-Vigna* complex and in related genera. 5. The subgenus *Sigmoidotropis* and *Ramirezella strobiliphora*. *Pollen and Spores* 25:5-40.
- STANKEVICZ. 1983. Note on *Vicia subvillosa* (Ledeb.) Boiss. and its relations with the genus *Orobus* L. *Research Bull. N. I. Vavilov Inst. Pl. Ind. Fasc.* 131.
- STANKEVICZ. 1983. The genus *Vicia* L. and its position in the tribe Fabeae. *Bull. Appl. Bot., Genet., Pl. Breed.* 72(1).
- STANKEVICZ. 1983. *Lathyrus vinealis* (Fabaceae) - a new species for the Flora of the USSR *Bot. Jour.* 1983 (10).
- STIRTON. 1983. A new species of *Eriosema* (Fabaceae) from the Eastern Transvaal. *Jour. S. Afr. Bot.* 49(4):451--454.
- STIRTON. 1983. Two new species of *Otholobium* (Fabaceae) *Jour. S. Afr. Bot.* 49(4):337-342.
- STIRTON. 1983. Two new species of *Psoralea* (Fabaceae). *Jour. S. Afr. Bot.* 49(4):329-335.
- Therrien, M. C. and GRANT. 1983. Induced quantitative variation for agronomic and related characters in bird's-foot trefoil (*Lotus corniculatus*). *Can Jour. Plant Sci.* 63:649-658.
- Trift-Farah, N., M. Trift, MARRAKCHI. 1983. Etude de la variabilite des esterases carboxyliques chez quelques populations naturelles de deux especes du genre *Hedysarum*. *Agronomie* 3(5):423-427. [Variability in carbonylic esterases in natural populations of two *Hedysarum* species.]
- THOTHATHRI. 1982. Leguminosae: Genus *Derris* Lour. *Fasc. Fl. India* 8:1-33.
- Thulin, Mats. 1983. Leguminosae of Ethiopia. *Opera Botanica* 68, 223 pp.

- VASSAL. 1982. Valeur taxonomique du caractere diaphyllode dans le genre *Acacia*. Bull. Soc. Hist. nat. Toulouse, T. 118:125-130, I tabl., I. Pl.
- VASSAL. 1983. Interet des *Acacias* pour l'aménagement de la Corse. Etude Generale et experimentation. Publication SOMIVAC, 52 pages.
- VASSAL. 1983. Gommiers et production gommier in *Acquisitions recentes dans les domaine des hydrocolloides vegetaux naturels*, pp. 5-17 (colloque des 6-8 Mai 1982, Bendol). Presses Universitaires d'Aix Marseille [en vente a l'ICOL, IUT, rue des Geraniums, 13337 Marseille cedex 14, France].
- VERDCOURT. 1982. A revision of *Macrotyloma* (Leguminosae). Bentham-Moxon Trustees, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, England. [138 pp. £12. 24 spp., illustrated.]
- Verma, R. C. and RAINA. 1983. Cytogenetics of *Crotalaria* VIII. Male meiosis in 26 species. *Cytologia* 48:719-733.
- VIJAY KUMAR and N. Ramayya. 1982. Morphology of the inflorescence and leaf in *Indigofera aspalathoides* Vahl ex DC. *Ind. Bot. Repr.* 1:158-160.
- WUNDERLIN. 1983. Three new species of *Bauhinia* (Fabaceae) from Ecuador. *Brittonia* 35:335-340.
- WUNDERLIN. 1983. Revision of the arborescent *Bauhinias* (Fabaceae: Caesalpinioideae: Cercideae) native to Middle America. *Ann. Missouri Bot. Gard.* 70:95-127.
- YAKOVLEV. 1984. Notes on genus *Caragana*. *Bot. Zh.* 69(3).

